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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/723,077 | 11/27/2000 | Daisuke Suzuki | 8409-000042 | 4247 |

29293 7590 07/02/2003

FREUDENBERG-NOK GENERAL PARTNERSHIP
INTELLECTUAL PROPERTY DEPT.
47690 EAST ANCHOR COURT
PLYMOUTH, MI 48170-2455

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| EXAMINER |
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WILLS, MONIQUE M

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| ART UNIT | PAPER NUMBER |
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1746

DATE MAILED: 07/02/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/723,077

Applicant(s)

SUZUKI

Examiner

Wills M Monique

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– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 April 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) 20-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 and 29-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

Claims 20-28 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected method of making a fuel cell gasket, there being no allowable generic or linking claim. Election was made **with** traverse in Paper No. 5.

Claim Objections

Claims 1-19 and 30 are objected to because of the following informalities: the claims have terms that lack antecedent basis. Appropriate correction is required.

More specifically, in claim 1, "said tab" lacks antecedent basis. In claim 11, "said first sealing portion" and "said second sealing portion" lack antecedent basis. The term "an opposite" in claim 11 line 4, should be replaced with "an opposite side". In claim 29, "sealing portion" lacks antecedent basis.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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In claim 1 the overall arrangement of the device is unclear. Due to the antecedent basis issues of the "said tab portion", it is unclear as to where the tab is located in the gasket. The examiner recognizes that the tab is adjacent to the gas diffusion layer, but there is no indication as to where both layers should be located. In other words, it is unclear as to how the gas diffusion layer and the tab portion fit in the device.

Similarly, in claim 11, the overall arrangement of the device is unclear. Due to the antecedent basis issues of the "said first sealing portion" and "said second sealing portion", it is unclear as to where the first and second sealing portions are located in the gasket. The examiner recognizes that both sealing portions are adjacent to respective flow field plates, but there is no indication as to where each sealing portion/field plate should be located. In other words, it is unclear as to how the sealing portions and flow field plates fit in the device.

Additionally, in claim 11 "second perimeter web portion" is of uncertain meaning because the claim does not include a "first perimeter web portion".

The remaining claims 2-10 and 12-19 are indefinite based on their dependency to the above.

Claims 36, 38 & 41-44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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The term "high line sealing pressure" in claim 36 is a relative term which renders the claim indefinite. The term "high line sealing pressure" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear as to what "high line" refers to and further, how high the "high line" should be.

Claims 5,16 and 31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The terms "Nylon", "Mylar" and "Kapton" are trademarks and used to identify the carrier. If the trademark or trade name is used in a claim as a limitation to identify or describe a particular material or product, the claim does not comply with the requirements of the 35U.S.C. 112, second paragraph. Ex parte Simpson, 218 USPQ 1020 (Bd. App. 1982). The claim scope is uncertain since the trademark or trade name cannot be used properly to identify any particular material or product.

Information Disclosure Statement

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate

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paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-19 and 29-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonk et al. U.S. Patent 6,399,234 and further in view of Winsel U.S. Patent 3,660,166.

Bonk teaches a gasket assembly for a fuel cell including an elastomer seal (abstract) The assembly 10 includes a cathode water transport plate (carrier) 12 and anode water transport plate (carrier)16. Water transport plates 12 and 16 (carriers) are preferably formed of graphite powder, cellulose fibers, and reinforcing fibers all bonded together with a thermosetting resin and heat treated to convert the organic materials to carbon. Disposed between cathode water transport plate (carrier)12 and anode water transport plate (carrier)16 is a membrane electrode assembly (MEA) 20. Within the membrane electrode assembly 20, a cathode substrate 32 with a cathode gas diffusion layer 50 thereon and impregnated substrate edge seal 52 (sealing portion). Seal 52 is preferably formed by extruding a

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thermoplastic polymer, such as KYNAR, available from Westlake Plastics, into the periphery of the substrate. Cathode gas diffusion layer 50 is substantially co-extensive with a central portion of cathode substrate 32 which does not include seal 52. Also provided is anode substrate 34 with an anode gas diffusion layer 38 thereon and thermoplastic impregnated substrate seal 36 (sealing portion) which may be formed in similar fashion to thermoplastic seal 52 (sealing portion) and may employ similar materials. Anode gas diffusion layer 38 is substantially co-extensive with a central portion of anode substrate 34 which is not embedded with seal 36. Alternatively, the gas diffusion layers 38 and 50 may be, respectively, laminated on either or both substrates 32 and 34. See column 6, lines 10-45. Between various components of the fuel cell assembly 10, thermoplastic material is provided to effectively bond and seal components of assembly 10 relative to one another and simplify the stacking process. In particular, thermoplastic material (adhesive layer) 46, THERMOBOND film, is provided between cathode substrate seal 52 and proton exchange membrane (ion exchange membrane) 48. Other suitable thermoplastic materials, such as TEDLAR.

(8) Anode substrate surface seal (first sealing portion) 42 is provided on anode substrate 38 which is also preferably of thermoplastic material. Cathode substrate surface seal (second sealing portion) 46 is provided on cathode substrate 32 and is also preferably of thermoplastic material. Thermoplastic layer 68 (base) is provided between anode water transport plate (carrier) 16 and cathode water transport plate (carrier) 12 of the next repeating cell stack (first and second members). This enables effective and reliable bonding and sealing between water transport plates (carriers).

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See column 6, lines 50-68. The gas diffusion layers are typically 0.002 inches to 0.005 inches thick. The fuel cell construction of the PEM cell reactant flow field plates and a cell separator (column 7, lines 60-68). The bonding material employed may be a thermoplastic polymer, a thermoset polymer or an elastomer. The thermoset polymer may be a phenolic polymer. The thermoset polymer may be an epoxy polymer and the elastomer may be a silicone polymer. The thermoplastic material may be polyolefin, polyvinyl fluoride or polyvinylidene fluoride. Further, the gasket material may be neoprene rubber or silicone rubber. See column 9, lines 45-55. A number of sub-stack assemblies 100 are stacked and sealed relative to one another by a soft compliant semi-round sealing bead 106, such as a foam rubber or other suitable materials. The seal maybe a molded configuration which contains ridges (apex at tips of the ridges) that increase the sealing pressures and thereby improves the effectiveness of the seal. (column 9, lines 20-30 and Fig. 1).

Bonk is silent to the layer order of the gasket constituents (claims 1,3,11,15 & 29) and a tab portion (claims 1,3,11, 15 & 30). The reference does not expressly disclose the carrier thickness (claims 9,10 & 18) or the sealing bead shape factor (claims 19,38,40,43 and 44).

However, Winsel teaches that it is conventional to employ tab portions (8) as electrical connections that project in one or more areas beyond the frame border of gasket material. The tabs may be conductively connected with each other, outwardly of the border of gasket material. The tabs projecting outwardly of the gasket border also are good conductors of heat energy, and their large surface areas exposed to the

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liquid or gaseous medium surrounding the cell or battery make them effective heat exchangers for the cooling of the cell or battery. See column 4, lines 30-50.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the tab portion of Winsel in the gasket assembly of Bonk, in order to obviate over heating by cooling the cell.

As to the layer order of the gasket constituents (claims 1,3,11,15 & 29), it would have been obvious to rearrange the carrier member, elastomeric member, sealing portion and adhesive layer in order of the subject invention, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

Regarding the thickness of the carrier (claims 9,10 & 18), according to the specification at page 5 lines 1-2, the carrier can also be a gas diffusion layer. Bonk teaches water transport plate carriers but is silent to the thickness of these carriers however, the thickness of additional gas diffusion carriers are typically 0.002 inches to 0.005 inches thick (column 7, lines 60-68). Therefore, Bonk satisfies the carrier thickness limitations.

Concerning the sealing bead shape factors (claims 19,38,40,43 and 44), it would be reasonable to expect the sealing beads of Bonk to have the same shape factors as the subject invention because they are made from the same material. More specifically, the sealing beads of Bonk may also be fabricated from fluoropolymers and thermoplastic elastomers.

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Conclusions

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fronk et al. U.S. Patent 6,362,376 teaches a corrosion resistant PEM fuel cell. Barton et al. U.S. Patent 6,057,054 teaches a membrane electrode assembly for an electrochemical fuel cell and a method of making an improved membrane electrode assembly.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (703) 305-0073. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

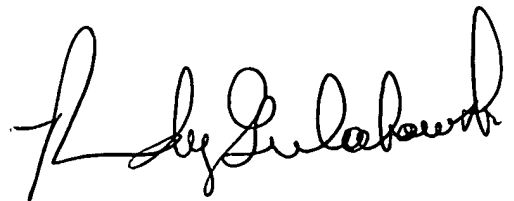
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Randy Gulakowski, may be reached at 703-308-4333.

The unofficial fax number is (703) 305-3599. The Official fax number for non-final amendments is 703-872-9310. The Official fax number for after final amendments is 703-872-9311.

Mw

06/23/03


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